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NITROGEN IN CORN.

All plants of whatever kind derive their main supply of nutrition from three sources: potash, phosphoric acid, and nitrogen. The two first are exclusively the product of the degradation of the rocks, either directly or indirectly; the latter almost wholly, perhaps entirely so in the earlier stages of creation, of the atmosphere. Since then it has been found associated with the organisms that are the product of these degradations. In the earlier stages of man's existence, when necessity for food and raiment had not quickened his mental activity, the "earth yielded her increase" without much questioning. When these had ceased to be spontaneous and "the sweat of the brow" had to be used to produce them, then this power of observation was brought into play to shorten the hours of labor necessary to produce them and to supply the demands

Chemistry came into play to increase the length of man's life; to save him from the "ills that flesh is heir to;" to avert death—the unknown, the feared.

But as large possessions came into existence; as one section did not produce grain equally well with another; as barter of one thing for another became troublesome, the need for something to represent both differences in value, and even the articles themselves, became a need. As some articles, from their scarcity, or from their holding their color, became more sought after than others, notably gold, there came a demand for it, and to supply this the chemists for ages spent fortunes and lives in the struggle to produce it by the transmutation of the commoner metals. To this struggle we owe most, if not all, of the discoveries of modern chemistry. To Davy and Leibig of past days, to Wagner, Way, and others of more recent ones, we owe its application to the soil to make larger crops, to restore worn-out soils, just as centuries before it had been used to escape death and to build up depleted and run-down constitutions.

All thinkers may be divided into two great classes—the optimists and the pessimists—the one overrating, the other depreciating all science, and, for the matter of that, all discoveries. In no branch is this more true than in chemistry, and its cognate branch, medicine.

These views are the outcome of Prof. Massey's question, some time since, as to the authority for X's statement, "that corn got half of its nitrogen from the atmosphere." If Director Atwater's very guarded

statement, to be found in the Digest of the Annual Reports of the Experiment Stations for 1888, can receive, or has received, belief, then it must be accepted as a fact. In the Digest of the Annual Reports of the Experiment Station for 1888, eighteen experiments at the Storrs' School of Connecticut showed that land yielding 50 to 60 bushels of corn with the stalks removed from 70 to 75 pounds of nitrogen. Now, when 25 pounds additional of nitrogen, with mixed minerals, were added, the yield was only 4.4 bushels more than when potash and phosphoric acid were used, and the question is asked, "that where one-third or less of the total nitrogen only was added, where did the other 48 per cent. come from?" That in some way corn does obtain large quantities from the soil, or air, or both," is the answer.

In Kentucky, in every case where potash and nitrogen were used on the crop than in the fertilizer. In Ohio nitrogen may often, not always, be omitted from a fertilizer without detriment to corn."

And in the March number of the Experiment Station Record we have, "Corn gets along very well and gives fair returns when the fertilizers contain one-third to one-half of the nitrogen removed by the crop."

"Even the humus and ammonia in a soil cannot be oxidized and converted into nitric acid unless by free access of air and a moist soil." (Ag. R., 1885, p. 162). But the air itself is four-fifths nitrogen.

Again, in Digest of Agricultural Experiment Station Reports, it is stated that "Nitrogen proved insufficient as a manure when applied in the form of a fertilizer, in 46 out of 80 cases, or three-fifths, i. e., did not increase the crop over 4 bushels per acre. That corn is unlike the other cereals and cannot be fertilized the same way as wheat and oats with profit."

In Kentucky in every case where "potash was applied there was more nitrogen in the crop than was applied in the fertilizer." In New Hampshire "nitrogen in fertilizers had least effect on corn." On the assumption that no nitrogen was taken from the air by soil, or by the plants, an assumption to which later research is opposed, there is still, according to these estimates, an excess of nitrogen in farm manures in comparison with the potash and phosphoric acid.

In Vermont it was found that "corn did not need much artificial supply of nitrogen; if plenty of pot-

ash and phosphoric acid was given it would supply itself with nitrogen."

How now, Prof. Massey? Again: "Although the amount of nitrogen supplied was large, yet the crop contained even more nitrogen."

True, Prof. Atwater in his Report for October, 1889, says "the cereals with which experiments have not been completed do not seem to have the power of acquiring nitrogen from the air," but this is probably due to the absence of "root tubercles that Hellriegel pointed out as the source of this power, rather than to the results of his experiments.

In Missouri, it has been found that "the young corn-plant takes up nitrogen with wonderful activity," but this is precisely the time when the roots are the least, in comparison with blade surface.

In Ohio, "in every case nitrate of soda (nitrogen) failed to return its cost."

As long ago as 1853, Dr. James H. Smith, chemist of Maryland, in his Third Report, used this language: "I however believe that the addition of the inorganic matter will gradually supersede the necessity for the application of ammoniacal manure, by enabling the soil to absorb it from the atmosphere. The highest aim, therefore, of agriculture, is to return to the soil the mineral matters in which it may be deficient, and so to cultivate it as to enable it to obtain ammonia from the air."

"Even when nitrogen acted well in Ohio it had to be combined with phosphoric acid, or potash."

That nitrogen may often, but not always, be omitted from a fertilizer when applied to corn. (E. S. Record, vol. 2, p. 27, No. 3).

In Kentucky, "a large gain of corn followed the use of potash fertilizers."

Is there no nitrogen in corn? Lupton says it has 10 per cent.

Again, the attraction clay soils, and especially those rich in ferric hydrate, have for gases, shows conclusively their importance, and why leguminous plants with their broad leaves are conceded to imbibe nitrogen from the air, yet the power is denied to that longer-leaved grass, maize.

In Louisiana, "24 pounds of nitrogen seemed to be all that could be profitably applied," and, if so, where did the residue come from; certainly not from a soil deficient in it.

In Alabama, "potash proved valuable in drouth," but we have seen how plants grown with it had an abundance of nitrogen.

In Massachusetts, in eight trials in different sections, potash was the best fertilizer used in three cases;

in one phosphoric acid, and in four undecided.

In Kansas, 7.13 pounds of nitrogen are brought down by the snow and rains per year, or about one-tenth of the amount required by the corn per acre, leaving out of question that existing in the atmosphere as a gas.

In Maryland, "dried fish gave the better yield of corn compared with potash and phosphoric acid."

These extracts, while not proving that corn draws its nitrogen directly from the air, as Prof. Atwater indicates, nor in any amount given by others, seem to lead to the conclusion that it does. If not proved scientifically or experimentally, the testimony is at least "strongly circumstantial." When Prof. Atwater's detailed report is seen, then there may be reason to modify this statement.

In one of the Station Records he touchingly alludes to the criticisms the discovery had received. The Saviour mourned over Jerusalem that received Him not; Franklin was jeered, and Fulton scoffed at; Henry and Morse were derided, and Edison considered little better than a fool. Yet look at what has followed the utterances, if the word may be used, of all.

But we leave the subject to group together as best we may, not only the authority for the statement, but others bearing on the same subject.

X.

NOTES BY THE WAY.

I do not see how "Looker On," in the last number of THE FARMER, helps the matter any. X stated that corn got half its nitrogen from the air. I asked how it does so? We know that certain kinds of plants, the Leguminosae, accumulate nitrogen in the form of nitrates in the soil, by means of certain symbiotic ferment plants inhabiting their roots? But that any plant assimilates the free nitrogen of the air has, to say the least, never been proven. No bacteria nor unicellular ferments have been found in corn roots to give them the same power as leguminous plants. Therefore I would like to know how they get nitrogen from the air. The very indefinite statement that fertile soils contain 1 per cent. (one per cent. of their whole bulk?) of nitrogen, and corn requires 2 per cent. (2 per cent. of what?) does not mean anything that I can see. If a soil does not contain as much nitrogen as the corn needs for its maximum growth, it simply takes what it can get and makes an inferior growth. If a field of corn making 50 bushels per acre gets half its

nitrogen from the air, why does the same air only furnish the adjoining field enough to make 25 bushels? Or, is the air on a contract to supply only an equal amount with the soil? We know from patient experiments what the leaves and green parts of plants get from the air, and nitrogen is not one of them, so far as has been ascertained. Therefore I ask, if the statement is so positively made, that corn gets half its nitrogen from the air, how does it get it? I have never seen any proof that any plant gets anything from the air, through the regular process of leaf assimilation, except carbon-dioxide.

Our friend Kerr does not value crimson clover any higher than it deserves. It may not be of particular value in Mr. Henry Stewart's neighborhood, 4,000 feet above the sea, where the winters more nearly resemble New York than North Carolina, or Mr. Stewart may not have taken a notion to try it, a fact which would never deter him from expressing an opinion about anything. But in all of Piedmont and Eastern North Carolina it is of inestimable value. It is sown here between rows of cotton in September, and gives good pasturage all winter and is ready to turn under or mow in April, time enough to plant corn. It will grow on land which will not grow red clover at all, and if turned under and cow peas sown on the land, a large crop of pea hay can be cut, crimson clover again sown on the pea stubble and plowed under for cotton the next spring; the nitrification kept up for eighteen months in this mild climate will make a large improvement in the yield.

If Mr. Kerr would take the opinion of thousands of farmers in North Carolina who are finding this clover a God-send to them, he would come to the conclusion that Mr. Stewart, though perched upon a mountain-top, cannot see all over North Carolina, by a long sight. No crop of recent introduction can compare with it in value to Southern farmers. August is too early to sow it there, as it is apt to be killed by a hot spell in germinating, particularly when sown on well-prepared soil. This fact has led our farmers to adopt the opinion that it does best on land not specially prepared for it, and they generally sow in cotton or corn rows, or on a pea stubble. The main difference, I think, is in the shade for the young plant. Any time in September will do here.

A. B. says in his review of the Agricultural report: "The source whence corn gets its nitrogen is unexplained." Just so! We have no doubt it gets all its roots can find and does its best with it.

My opinion in regard to orchard grass was given years ago. I have modified it somewhat. Orchard grass, when cut as soon as the heads are out, makes a very superior horse hay. But you cannot convince hay buyers of this. It is good to hold steep land together and will grow on poorer land than timothy. But no one can afford to grow it on a large scale for hay, for the time it is in good condition for hay making is so short and the weather at that season is so apt to be catching, that large crops of it cannot be handled in time. Whoever grows hay as a sale

crop, and whose land is good enough for timothy, does not grow orchard grass. I was surprised to learn from Dr. Ellzey's letter that the Soja bean or pea does not ripen in Maryland. It ripens an enormous crop here, and Maryland farmers need not import the seed from any foreign land.

W. F. MASSEY.

Raleigh, N. C.

SCARLET CLOVER.

I have just read the articles in your June 1st issue by Messrs. Kerr and Cole, relative to Scarlet Clover, and desire to add my endorsement to the testimony of those gentlemen in what they have said about this most wonderful as well as valuable forage plant, either for its nutritive or commercial value. After a most critical test on the light alluvial soils of Delaware and Maryland for the past five years by such experienced cultivators as J. W. Kerr, R. S. Cole, E. H. Bancroft, John J. Rosa, Jacob G. Brown and many other equally capable gentlemen, Scarlet Clover has proven to be pre-eminently the peer of all other grasses grown in this section, and in my opinion no farmer should for one moment hesitate to seed every available acre of his farm with this clover the coming season. From my own experience with this clover, I am free to say that, no matter how apparently exaggerated the statements made in its favor have been, I believe the truth has not yet half been told, and we, as farmers, will only fully realize this when we derive the benefits that its use will demonstrate.

I have never seen any grass grow so luxuriantly on the poorest sandy knolls, where it would be a fruitless effort to endeavor to get a stand of any other grass, or possess so much nutritive value for feeding purposes, either as a green feed, as ensilage, or in its cured state, nor that would enrich land so rapidly as this clover when turned under as a green manure. I truly and sincerely regard it as the greatest boon ever fallen to the lot of our farmers. I have grown it under varied conditions, have fed it, both green and cured, to all kinds of stock, have plowed it under a manure and at all times and in every instance it has so far exceeded my expectations that it is impossible to keep from becoming enthusiastic in its praise. My father, Mr. Jacob G. Brown, of Kent county, Delaware, has grown it for the past five years, perhaps more extensively than any other farmer in Delaware or Maryland, having this season had over 300 acres of it on his farm, from which, after feeding his large herd of dairy cows, besides his other stock, for more than a month, on the green-grass cut every day, has also filled his silo, holding 185 tons, and has left a large acreage for seed, besides having already turned under many acres of it and planted the land to corn.

It will grow as well in an orchard as out of it, on poor soil as well as

rich—will grow in the fall and spring when other crops are out of the way—should always be sown in corn fields at the last working, in peach, apple or pear orchards, or in fact any other crop, when it is given the last working. Some of the best clover I had this year was sown last July at the last working of my watermelon patch. I have ten acres in wheat in which I intentionally omitted sowing timothy and red clover, so that it could be put into buckwheat in August next and seeded to scarlet clover, from which I expect next spring to cut two tons of hay to the acre, or, if preferable, to turn under as a green manure. Dr. Neal, director of the Delaware Experiment Station, says that plowed under in this way, its commercial value is \$24 per acre. I contend that we have here an opportunity to stop the terrible drain on our resources by the constant and liberal applications of commercial manures, that our light soils are constantly requiring, and by the use of this clover, enrich our land far more rapidly, surely and permanently. One dollar's worth of seed will seed an acre, and in no way can money be so well invested. I certainly hope to see its use become more general every year, as our farmers become more acquainted with its merits.

A. M. BROWN.

Washington, D. C.

SCIENCE PRIMERS.

The man who reads our Agricultural Reports, who looks through the Experiment Station Record, and sees the mass of reading on farming in its widest sense as embracing the varied subjects of botany, entomology, horticulture, etc., must confess the utter inability of a man of fair leisure, let alone the average farmer, trucker, planter, herder and feeder, to keep up with, let alone take in, keep and digest all that their reason, judgment, observation teaches them is worthy of adoption and of trial.

In this state of affairs it seems to us that if our Agricultural Department at Washington is ever to fulfill its mission of educating those for whose benefit it was created, it could do more effective work than to put it into a monograph, or primer, all that is known about a single thing, say corn, best variety for clay sand, or loam, mode of root growth, distance apart of planting for yield and for forage, depth to plant, mode of cultivation, shallow or deep, when to take fodder off, or to cut; together with its diseases and insect enemies from the noxious weevil that destroys the grain in the grainery, to the worm that eats up the corn on the cob in the field before it is ripe enough to be gathered.

Primers giving this in the plain language of the day would be welcomed, read, and their suggestions adopted because short and practical.

Two would take in the great cereals, corn and wheat; a third, potatoes; a fourth, tomatoes; a fifth, peaches; then the others according to their importance and value, either singly or grouped.

One should be devoted to feeding and the best and cheapest ration for work, growing, or fattening stock; a subject little understood and carelessly done—a mere random way without reason or thought.

These primers could be made cheap, short, practical and up to the needs of the farmer who would grow good crop and improve his land.

The chemists of our Agricultural College and Experiment Stations could do no more efficient and practical as well as thoroughly popular work, than to adopt a uniform nomenclature when speaking of the same subject, and to give the non-chemical reader a primer about free nitrogen, ether extract, nitrogenous and non-nitrogenous substances, and to explain why in so many of their analyses, otherwise valuable, nitrogen is left out. Lubig states that with every pound of ammonia that evaporates, 60 lbs. (a bushel) of wheat is lost.

Two illustrations occur to us. In an analysis of Illinois soil in Agricultural Report for 1885, the nitrogen and carbon is given; in that of 1886, of a beet soil the nitrogen alone is given, but in numerous analyses of the beet root and beet leaves given in the Report of 1867, nitrogen is not named as one of their constituents. Even such scientists as Wolf and Knob cover up the potash and phosphoric acid of plants in the general term "ash."

Another chemist gives an analysis of fertile soil, as "silica, alumina, oxys of iron, lime, other substances not determined." Where the potash is in the alumina the phosphoric acid in the iron, but their percentages are mere guess work. Then again we are given the percentage of ammonia in one place of a plant or soil and its nitrogen in another, yet roughly speaking, the nitrogen contains about three-fifths more ammonia than the latter. In another place we have "nitrogen x 6.25" for the "albuminoids," or their cost.

All of this kind of phraseology is misleading and perplexing. Every chemist should use the same word, or the same synonym when speaking of the same thing, just as Latin used to be the common language of scholars wherever raised, no matter what their vernacular was, Russian or English, Swede or Italian. In no other way can they reach the masses for whom they work and write.

That our criticism is not unjust, we quote from the Editorial Notes of Experiment Station Record, Vol. 2, No. 5. "Protein = total nitrogen x 6.25. But proteins differ very widely in chemical and physiological properties. Even the terminology is in great confusion."

The proteids = albuminoids and the gelatinoids.

Non-proteids. Nitrogenous compounds include the amides.

Fats = Ether extract, if from muscular or connective tissue is all right; but if from plants of diverse and widely differing constitution. The licethens (albuminoid bodies) appear to have a special nutritive value, and some of the alkaloids are poisons," for instance morphia, strychnia, aconitia, atropia and others. We want light. A.

WHAT IS THE MATTER WITH THE FARMER?

(Two papers read before the St. Mary's Farmers' Club.)

The trouble with farmers, I think, lies in a great measure with themselves. First—they are not self-reliant enough—they buy too much and sell too little. If they could live like the successful of old, with strict economy in all things and strict attention in all matters pertaining to their business and not be bothered by politics or politicians, particularly the little bosses that will flatter you and tell you that you can do great things—meaning for themselves all the time—and when they cannot handle you any longer, foot you with all their might. Have nothing to do with such men, and we will favor ourselves. We should make the farm self-reliant; take care of all little things, husband all manures that now go to waste; take care of all farm tools; have a place for them, and when not in use have them then under proper shelter, and they will last twice as long by such treatment—and shoot the first agricultural implement man that comes on the farm—also the fertilizer agents and tree peddlars, and all peddlars and agents—for we have to pay these fellows for bothering us at our work, hours at a time, and that the busiest. Let us buy from first hands and we will soon find a great difference in the price. The fertilizer man must have five dollars a ton for coming to see you—the tree man 15 cents on each tree sold—the agricultural implement man gets one-third to one-half the money you pay for the article sold you. Second—Do not try to imitate your city cousin or aunt in dress, diet, etc. It does not suit us; the need is different in both from us. Third—Never pay anyone to do a thing you can do yourself; do not sit around the stores and talk politics with the man behind the counter; he has nothing else to do but to stay there, and we lose valuable time and a little money, and nothing to get back but disappointment. I think we are looked on by all other trades and professions as legitimate prey and then be laughed at for our own looseness in being humbugged as hayseed in our own head. We must cut loose from all such ways of dealing; do like other business men, make everything tell for what it is worth. We must combine and make all others respect us, which they are bound to do; they cannot do without us. I think that these and other things, as mismanagement of our country affairs, high taxes, tariffs, trusts and combines, are all against us; let us up and at them. This is what is the matter with farmers.

J. THOMAS ABELL.

The above question is a "corker" and will admit of quite a lengthy discussion, but I will try to be as short as possible, and at the same time tell you a few things I know of his shortcomings:

I have traveled over a great portion of the farming country of Maryland, Pennsylvania, Virginia and Delaware, and must say that the farmers of Southern Maryland, so

far as I can judge, are away behind all the rest.

In the first place, we seem to lack energy and push, and secondly, we sadly lack system.

You may go through Pennsylvania and I will guarantee you will not see any farmers lounging around country stores playing cards and drinking whiskey. They have not the time to spend in such a way; they are at home doing something, as there is always something to be done on the farm. These people work. The saying is that "you cannot keep a working man down," and, I am sure this will hold good in the farmer's case.

Our lands are good—the climate is suitable for such crops as we grow. We have good markets. Now, why can't we make some money and keep our heads above water? "The fault is not in our stars, dear Brutus, but in ourselves that we are underlings." Now then, let us get right down to the many causes of our delinquency. Our farms are too large. 100 acres of good, arable land well worked will pay more than double that quantity of land worked as most of us do.

Let us keep the ox-carts off the roads. An ox-team is good enough in its place and that place is on the farm. When we send to the mill for a little meal, we send a man with an ox-team. If the mill be six miles away, the man is gone all day and his valuable time is spent on the road. How much better it would be to send your wagon and horses, get your meal and come home and spend the balance of the day doing on the farm what ought to be done. This may seem a small item, but it counts all the same.

Why can't we have good cows? Two good cows will yield more butter and milk than four such cows as we generally have and only eat one half as much?

Why do we plow three small horses when two good sized horses will do the same work and not cost us as much to keep?

Why do we feed 6 hogs, trying to make them weigh 1200 lbs., when four hogs would weigh the same and not cost anything like as much? I will tell you why we do this! It is simply because we are not progressive; we are too easily satisfied.

WILLIAM A. HAMMOND.

WILNA FARMERS' CLUB.

The Wilna Farmers' Club met at the residence of the President, Mr. Robert T. Bowne, May 20th.

The club inspected the premises in a body, after which the committee on inspection reported, saying that Mr. Bowne's garden looked well. He has some potatoes which are very forward. Mr. Bowne explained that they were planted last spring and had not been dug in the fall. He has had them cultivated. The result will be awaited with interest. The buildings are in good order and the farm altogether very attractive.

The topic appointed for discussion was, "Is fruit raising profitable in this section?"

The general opinion was that at this distance from market it would

not pay to enter largely into the business, but that money could be made by raising small fruits, besides the advantage to the health of the farmer's family by having fruit for home use.

The President thought a few acres in strawberries, blackberries, raspberries and gooseberries would bring a large revenue.

Thos. Hollingsworth thought it would pay to raise fruit with other things. The fruit grown on the farm is sweeter and better than that shipped from a distance.

A. B. Hollingsworth sold, one year, \$100 worth of apples from a young orchard. It paid better than other crops because not much money was invested in fertilizers and cultivation. The fruit will be better if the orchard is fertilized and cultivated. No sod should be allowed to grow in the orchard and the cultivation should be shallow when the orchard begins to bear.

N. T. Hollingsworth was in favor of having plenty of fruit for family use, and it is convenient for making up a load for marketing. Grapes sell well but are difficult to raise.

Geo. W. McComas said fruit of extra quality will always bring a profitable price, but it requires better land and more care to grow the best fruit than that of ordinary quality. Strawberries will pay over \$200 an acre. He advised the shipment of small fruit to Philadelphia instead of Baltimore, as better prices are obtained there and the difference in freight charges is small.

Samuel S. Bevard thought there is profit only in raising strawberries and blackberries. The farmer should, of course, raise all the fruit he needs throughout the season for his family.

Silas W. Hollingsworth said that in raising apples and pears for market only the best kinds should be selected. There is some profit in apples.

Geo. G. Curtiss said that at our distance from market the cultivation of small fruit is not profitable. One good large orchard might be profitable in supplying the neighboring towns, but if every farmer had such an orchard the supply would exceed the demand. Grapes might be found profitable, he thought.

William I. Price said it is profitable to raise fruits for family use, but this section cannot compete with the lower river regions in growing fruit for market.

Joseph B. Hoskins once took six bushels of gooseberries from twelve bushes and sold them at \$2.50 a bushel. He gathered them with buckskin gloves on his hands, passed them through a grain fan and blew the leaves out. Apples at 50 cents a bushel in the orchard pay as well as potatoes at 80 cents to \$1 a bushel. To keep an apple orchard bearing it must be top-dressed with barn-yard manure every three years.

Edward Hollingsworth said he has an apple orchard which has never been cultivated. It is covered with a splendid set of green grass and has a large crop of apples on the trees this year. He pastures it with cows and calves and allows his hogs to run in it, but does not permit them root up the ground. Four hundred dollars' worth of strawberries can

be grown to the acre, without much labor.

The club will meet again on June 17th, at the residence of Mr. Samuel S. Bevard. The subject selected for discussion is the improvement of the public roadsides.

OYSTERS.

Sixty thousand of our Maryland people directly (how many more indirectly, as canners and their employes, the owners of the lands bordering on the oyster grounds, etc., cannot be told), are interested in the oyster question, that their production may not be lessened, but increased to meet the demand of an ever-swelling population. To protect the interests of those interested requires the constant services of two steamers and thirteen sailing craft, mostly small. Recently the State has witnessed notable gatherings of the people in various sections, addressed by accomplished men, to give an expression of opinion how to keep up the oyster supply, and how to restore "depleted beds."

Among the States interested in this oyster question is New Jersey, and so intimately connected with the agricultural interests does her authorities suppose it, that over twenty pages of the "Tenth Annual Report of the State Agricultural Experiment Station" is given to the subject. And from that, in endeavoring to keep the FARMER fully up with what is known, we extract the following:

"The artificial propagation of spat does not seem to be any more difficult than fish breeding. Oysters spawn between July 5th and 15th, with a temperature of between 82 and 83 degrees. The spat need something to attach themselves to, that they may form their shells and live. Bushes, poles, oyster shells, tiles, and wire netting have been used for this purpose. This is the most difficult part of the process, it being possible to hatch them in a place where they cannot be raised.

"A quart of oysters is equal to a quart of milk, to a pound of lean beef, a pound and a-half of fresh cod, and two-thirds of a pound of bread, in nutritive value.

"Their value is great as a food for weak stomachs, a single oyster containing enough of digestive ferment to digest its own substance." If we could get at "the energy required to digest them it is probable oysters would stand superior to any other food." An oyster is probably richer in nutriment in April than November.

E. A.

PREPARING FOR DROUTH.

It is a blessed thing for a farmer to not have so much to do, personally, that he cannot take time to study and think over the management of his crops. Constant care and thought and watchfulness are needed in order to do one's best under the present circumstances, which are constantly changing and seldom the same two years in succession. It would have been a very serious blunder if I had managed my potatoes this season as I did last. Last spring we had rain in excess. The past month we have had little, and the weather has been

unusually drying—bright sunshine and strong winds. Last year the less tillage given up to the first of June the better, except what was necessary to keep weeds down. This year a large amount of work has been necessary, if one wanted to do his best.

But to come back to the point. I rolled a six-acre piece of potatoes right after planting, while my man preceded the roller and followed it with a harrow. I had put a great deal of work on the land before planting, because the indications were strong in favor of a spring drouth. In any ordinary season I would not like to roll after planting. It firms the ground too much. One cannot kill weeds as well with the harrow. But this promised to be an unusual season. The best precautions must be taken against our seed drying up in the ground and against unnecessary evaporation of moisture, even at some disadvantage in other respects. It is best to choose the lesser of two evils. I did not go and examine closely after my man finished harrowing that piece. It seemed to be in perfect shape. Work was pressing us greatly. But after a time I "felt it in my bones" that I ought to go and look through that field. Inclination said "no, push on and finish what you are doing." But I listened to the prompter, and although I could think of nothing to be gained by it I went all through the field and spent an hour, perhaps, thinking. Part of the field is clay. Here I found the harrow had stirred the drills well, that were raised two or three inches by the covers on the planter; but between the rows it had done little to the rolled and packed ground. "Well," I says, "Terry, is this the way you are preparing for a drouth? Is this doing your best that you write about so much? Why, you careless man, you have rolled that ground to make it bring up moisture from below, to make your potatoes grow in spite of drouth, and then have left part of the surface without any mulch on to check evaporation. How many hundred barrels of water do you suppose you have allowed to go to waste? To be sure there isn't much of the surface in this shape; but there should not be any. And then again there are three spots in this field, say half of it, that ought to be rolled again. The surface is not quite as fine as it might be. If this drouth continues another month you will not be sorry for every possible preparation for it that you can make. By the way, what was the reason those harrow teeth failed to take hold on the hardest ground? I wonder if you have been careless again and allowed them to get dull? Let us go and see." Why, they are as blunt as the end of my fingers. In a short time those seventy-two teeth were made sharper, the blacksmith said, than he would have dared to make them for any one else; but he obeyed my orders. Then my man with one team harrowed over the spots that I thought were not quite fine enough, and I followed him with the other team and roller, and then he cross-harrowed the whole piece. That land now is in the best shape to withstand drouth that we possibly know how to put it.

While I think of it, the above experience may give a hint of why one-eye pieces of seed potato are not

always safe for ordinary tillage. Some years ago when the writer was sick, so much so as not to be able to oversee at all, his man planted good seed cut to one eye, on good soil. But it was such a spring as this, and the man lacked judgment—didn't think, just worked with all his might with his hands. The crop was an entire failure, and I had the field torn up and Hungarian grass seed sown as soon as I got around to see it. His tillage would have brought a crop last year.

Last spring the writer urged all who grew potatoes to keep the surface of the ground constantly stirred between the rows, that is, never let a crust form after a rain, and stir again in a week if it doesn't rain. This is the way to get a crop in a dry year. Other conditions being right, one can grow a fair crop any season that I have ever seen. You will now see that we try to check all unnecessary evaporation before the potatoes are up also, unless it is a very wet time. Our ground is not allowed to dry out after plowing such a season as this. There is no use of using thousands of barrels of water when the prospect for getting more is poor. There is a large supply of moisture stored up down below, which is constantly being brought up by capillary attraction; but unless we check all unnecessary waste of this it will be likely to grow pretty short before the end of a long drouth. Evaporation is very rapid from land where a crust is allowed to form. An inch or two of freshly stirred surface makes almost a perfect mulch to check this. How few farmers understand this, or put their knowledge into practice. He who arranged for the drouth gave man dominion. "Where there is a will there is a way." "Labor conquers all things." There is scarcely a limit to man's power. A local drouth may, of course, injure a farmer; but a general one need not anywhere in this latitude. It is then that skill has a chance to win.—T. B. Terry, in *Practical Farmer*.

POULTRY YARD.

POULTRY RAISING PROFITABLE.

Why is it that comparatively so few people, who are situated, and I may say calculated, to enter into what I consider the most fascinating, and, without doubt, the most profitable business one can engage in—raise poultry? If men who are now crying "hard times," and bewailing themselves that they are not making a living, but going back year by year, would enter into this field, which is a very large and extensive one, and which promises large remunerative profits for the capital invested, would engage in it and carefully study all the little details and attend to them, how soon would they find themselves on the road to success and competency; for money has been made, and that too, largely, by many in the past, and who are making at present, and which can be done in the future; especially as the hen has now been protected by the tariff. But methinks I hear some thick-headed person say that the business would so be over-done, and the cost of care and keeping

would far excel the receipts; but let me tell you, my thick-headed friend, such will not be the case for many, many years, not at least while you and I, as well as the rest of our fellow-citizens, like to eat eggs and everything that they are used for; and is not our population largely increasing year by year, and as the production has been far behind the demand in the past, and as it is at present, what is the chance of over-production in the near future? Compare the prices of eggs at the present time with some years back; also the price of both live and dead poultry, and say if there is any danger of over-production. I claim that instead of importing for use into this country, from Europe, poultry products, we should at least endeavor to supply the demand at home; but it appears that it can not be done, for it seems that the more that engage in the business the greater is the demand and a greater appetite is created for the production of the poultry-yard, and why should this not be the case? Is not the meat of the young fat chicken more palatable and far more wholesome than either pork or beef? In this age of invention, when the incubator can be had, which will do the work as well as the hen, and at far less cost and still less loss in the eggs, I do not see there is any excuse why we can not hatch and raise chickens cheaply and at a good profit. What does the last census show with regard to the poultry business? That it is of far more value than the cattle and dairy interest, and, if I have been rightly informed, than of all the live-stock productions in the United States. Now why should we not enter into it, or stick to it? It is an easy and fascinating one, and when one has a love for it and attends to all the little details, success is sure to follow.

E. H.

Forest Hill, Md., June 3d, 1891.

PREVENTING INSECT PESTS.

When insect pests first invade the poultry house they marshal their forces in vast armies, as though aware that they must make up in numbers what they lack in size. And in fighting them the old adage, "An ounce of prevention is worth a pound of cure," is quite as true as though it had been made with special reference to their case. So we will begin in time and see how best we can forestall them. First, all nesting material, as hay, straw, excelsior, or any other combustible stuff which has composed the nests for the sitting or laying hens, should be piled up in the yard and burned; then the nest boxes must be carefully brushed out and white-washed, the lime being forced into every little crack and cranny, the favorite hiding-places of the wicked little nuisances. This white-wash should be made rather thick with lime, and cannot be called exactly white because it contains a generous quantity of crude carbolic acid, say two ounces to the gallon, besides a large tablespoonful of flowers of sulphur—both deadly poisons to all insect life. If a pound of rock salt be dissolved in the water with which the lime is mixed, its sticking quality will be improved.

After the nest-boxes are dry, a

small amount of nesting material should be placed in them; barely enough to keep the eggs from contact with the wood, and if convenient mix with it a few leaves of trashy tobacco or a few stalks or stems, as a further preventive. In these new, clean nests I would have no nest eggs but artificial ones; the milk-white glass or china are best; then if the hatching season is over, the nests will keep clean and nice for a long time. But before replacing the nest-boxes, the whole interior of the house should be thoroughly cleansed, the walls brushed down, perches taken out so that the plate on which they rest may be brushed off, and the perches, plate, walls, underside of the roof, if it can be reached, support of the nest-boxes, and everything in the house, in fact, should receive a good coating of this most odorous concoction called white-wash. A liberal quantity should be splashed over the floor, too, so as to run down in all the little cracks, and the floor, after it is dry, covered with dry earth or sand. It is said that the best way to put on the wash is with the force pump; adjust the spray nozzle, and soak the whole interior; but as we haven't anything of that kind, I simply had the man who does the yard jobs use an old white-wash brush, which answered the purpose pretty well. It is really man's work, and hard and disagreeable work, too, lifting and reaching up above one's head; but it pays to employ a strong and efficient man who will do the work thoroughly well, because one or two such applications during the year will effectually free the house from all parasites—that is, provided the house be kept clean, and manure not allowed to accumulate anywhere. If the outside of the house is not painted, it would be well to give that a coating of white-wash, also, as well as coops for the young chicks.

The yard should next receive our attention; the loose boards and bits of old lumber which are so apt to accumulate where fowls are kept, should be picked up and placed where they will keep dry in case they may be needed as flooring for the coops of young broods and for repairs generally. Next, rake or sweep the yard and have the trash carried off out of reach of the flock; some advise spading up the yard or scraping off several inches of the top soil and having it carted away, but as I haven't been able to get that done, I simply had coal ashes scattered over those portions most used, and, therefore, most likely to become muddy in rainy weather. Coal ashes are a fine absorbent of all impurities; besides, the hens seem to find great entertainment in picking about among the cinders, though whether they use any of them as gritty material, I cannot tell; the charcoal from wood ashes, when small enough to swallow, is eagerly devoured, I know, but this, I suspect, is ground up with their food and is said to be exceedingly beneficial in many ways.

New dust baths should be provided at this time, and if a teaspoonful of powdered sulphur and one of carbolic acid be sprinkled through the dust, the fowls will the better be enabled to rid their bodies of parasites. For this purpose I have been advised to give the flock a dose of

sulphur in their food once or twice a week during warm, dry weather, and have found it very good. One desert-spoonful to a gallon of soft food is about the right proportion.

As a further precaution against the accumulation of vermin, I find it best not to let a single hen sit in the poultry house after April, and during summer all the laying hens have their nests out of doors, most of them under the apple and peach trees in the orchard where their house is built.—*Cor. Country Gentleman.*

HORTICULTURE.

JUNE FALL OF PEACHES.

Passing under a tree to-day where the "June fall," so-called, was taking place, curiosity induced the examination of a number of the down ones. In so doing the peculiar brown color of the incipient kernel was found, with the condition new to us that at least three-fourths of them were entirely empty, which was not the case with the living ones on the tree. In this respect they forcibly reminded us of an infertile egg. It points to an infertile pollen on one side or the other. It points to immaturity in either one or the other. May it not come from immature, unseasoned wood, that produces pollen of a like kind? Perhaps some of our botanists can tell how to distinguish mature from immature pollen, and thus a point be gained in the investigation. Old-time peach-growers, when seedlings were the rule and not the exception, used to say weather did not stop their bearing once in two years. Our budded fruit bearing every year may not have time to mature its pollen. The question is worth investigating.

Since writing the above I have seen the report of the biologist of the New Jersey Experiment Station, who states that the apple set no fruit when the blowers did not get dry. And it is particularly gratifying to know that his general ideas of the office of the pollen follows those given above.

L. C. B.

THE BORDEAUX MIXTURE.

It is odd that with all the general information possessed by the journalists who prepare our daily papers, they are so ignorant of what goes on around them outside of mere news and politics. Only yesterday the Baltimore Sun published editorially, as a grand new discovery just printed in the London Times, that the compound of copper, sulphur and lime, called the "Bordeaux mixture," is a very efficient fungicide.

Experiment Stations all over the land have been for years past testing the various copper mixtures and publishing the results in thousands of bulletins, and yet this great daily paper has just heard of it through the columns of the London Times and hastens to call its readers' attention to the great discovery as promising great things to this country, after vineyardists have read the Baltimore Sun. We hasten to assure the Sun that there is hardly a grape grower in America that has not had and tried the formula for Bordeaux mixture and other copper mixtures, and hardly a country druggist but

has made profit out of the matter which the London Times and the Baltimore Sun now print as a new and wonderful discovery. We recommend the Rip Van Winkle newspaper folks to read up our back numbers of Station Bulletins, and they will find more things that the London Times and Baltimore Sun have not yet heard of. W. F. MASSEY.

Raleigh, June 7, 1891.

PROPAGATING ROSES.

The following notes are taken from Ellwanger's book, "The Rose":—There are four methods used in propagating Roses—by cutting, by budding, by grafting, by layering; in importance they rank in the order named, and in this order we will briefly consider them.

CUTTINGS.—There is no doubt but that plants grown from cuttings are the most useful for general purposes, and the greater number of our choice varieties can be grown in this way without difficulty; but there are some beautiful kinds, like Baroness Rothschild, which root with great difficulty; these sorts can only be profitably grown by budding or grafting. Cuttings can be made at any time of the year. The old idea that the wood *must* be cut at a joint or with a heel, and that it is *essential* they should be placed in bottom heat, have been thoroughly exploded. The most successful propagation by cuttings, for the most kinds, is made during the late winter months from strong plants one or two years old that have been grown in open ground, potted in the month of November, or from plants which have been grown in pots for one year, or planted out under glass. Cuttings of all kinds which root freely, like General Jacqueminot, Victor Verdier, etc., can be made from one eye only, and cut between the joints just as well as after the old fashion of cutting to a heel, and with three or more eyes—an unnecessary and wasteful process. All of the large commercial establishments in America do most of their rose propagation in the months of January, February, and March; the cuttings are made to one eye and dibbled in beds of sand, or in some cases are placed in pots of sand and these pots plunged in beds of sand; underneath the staging which supports the cutting run hot-water pipes or flues; these are commonly boarded in to secure bottom heat, and this I believe to be the best method. Some rose-growers make no attempt at confining the pipes or flues, and produce excellent plants without resorting to bottom heat, but it is a slower process, and there is a somewhat greater percentage of cuttings that fail to root. Advocates of this system claim that they secure healthier, stronger plants in the end than they would by the use of bottom heat. There is no doubt that plants propagated in a closely confined house in a high temperature are apt to turn out of weak constitution, but we believe the best results follow where plants are propagated in a bed at a temperature of 70 degs., with the temperature of the house a few degrees less. However, these matters concern nurserymen and florists more than amateurs, for this class does

not care to put in operation anything that requires much expense. When but few cuttings are desired, they can be placed in pots and will take root in four or five weeks after insertion, grown in any ordinary conservatory or greenhouse. After the cuttings have taken root they should be potted in pots not exceeding two and a half inches in diameter. Certain kinds of Roses take root without difficulty, others are so stubborn that the amateur would do well not to attempt the propagation until he has proved himself an adept in growing the others. The sorts most difficult to root are the various varieties of Moss, most of the summer Roses, and certain varieties of Hybrid Remontants belonging to the Jules Margottin, Baronne Prevost, and Baroness Rothschild families. All of the Tea and monthly Roses, with very few exceptions, root and grow freely from cuttings.

Besides using green wood, some propagators make cuttings from hard wood—that is, shoots thoroughly ripened, taken in the autumn. Manetti cuttings are always made from wood taken in autumn, and the various varieties of Prairie Roses are often grown in this way. In some establishments large quantities of cuttings are made during the summer months and grown in hot-beds; the plants produced are salable in the autumn and are largely used by florists. In selecting stock plants from which to propagate, care should be had that only those be chosen which are vigorous and healthy, otherwise a sickly or weak progeny will result.

BUDDING.—This is an important method, second only to propagation by cuttings. The chief disadvantages are these; first, it is more expensive. The stocks are to be purchased and cared for, and it will be found that the labor of budding, suckering, cutting back stocks, etc., will make the operation far more costly than growing plants from cuttings. Budded plants are not desirable for inexperienced amateurs, since novices do not detect the suckers which, not infrequently, come up from the roots, and if not cut away ultimately choke the plant. A third objection is found in the fact that budded plants are more frequently killed by severe winters than plants on own roots. On the other hand, by budding we are enabled to grow varieties which are so difficult to root from cuttings, that their propagation would be discontinued by all large Rose-growers were it not for this method. Varieties like Baroness Rothschild, Mabel Morrison, Marguerite de St. Amande, etc., are as yet almost indispensable, but no nurseryman would long grow them from cuttings. There is another class of Roses often advantageously grown by budding, these are varieties of moderate growth like A. K. Williams, Horace Vernet, Madame Victor Verdier, Mademoiselle Eugenia Verdie, Marie Baumann, Xavier Olibo, etc. All these kinds are invigorated by being worked on some strong stock, like Manetti. A third advantage of budded Roses is for use as stock plants, and also for forcing. Budded plants of many kinds (not the Jacqueminot type)

can be taken up in October or November, and with ordinary treatment will give as fine a crop of flowers as plants of the same varieties which have been grown all the summer in pots at much more expense and labor. I would not advise any reader to purchase budded Roses who cannot tell, by the wood, the difference between Persian Yellow and General Jacqueminot, between Marie Baumann and Salet—indeed, amateurs who cannot do this do not deserve to have Roses at all, for they would not be able to distinguish between the shoots of the Manetti suckers and their Louis Van Houtte or Victor Verdier (although the Manetti is most distinct from all other Roses.)

Many kinds of stocks have been tried on which to bud Roses, as the Brier, the Griffariae, etc., but for general use we very greatly prefer the Manetti. The Stocks are planted in nursery rows, about 3 feet between the rows, and 6 or 8 inches apart; in July and August the buds are inserted; the lower the buds can be put in the better, as the liability to send up suckers is thereby greatly diminished, and opportunity is also afforded the plant of being ultimately established on its own roots.

PROPAGATION BY GRAFTING. This is a profitable mode to pursue when done in winter under glass, using plants of Manetti or Brier grown in pots for the purpose. Grafting Roses on the root cannot be made profitable, as such a large percentage fail to grow. Stock grafting is carried on in England and elsewhere with great success, and although the plants are not so desirable (owing to the grafts being of necessity some distance above the roots) as those propagated by the other methods, it affords nurserymen an opportunity of more quickly securing a stock of new sorts, and also is advantageous as an aid in producing more vigorous plants of such varieties as Nepetos than can possibly be obtained from cuttings.

PROPAGATION BY LAYERING was once practiced to considerable extent, but it is a slow method, and is now but little used. Good plants can be obtained in this way of Persian Yellow and some other varieties which do not strike from cuttings, and it is the only method by which certain kinds can be produced on their own roots. Besides the methods spoken of, Roses are also produced from seed, but this is only done where it is proposed to secure stocks, as seedling Briers, or for obtaining new varieties.

CELERY CULTURE.

After more than a quarter of a century's experience the writer has failed to find an easier road to success in the production of a first-class article, than the one traveled over by generations before. Fertile soil and a good stock of common sense are important factors in the problem.

We purpose giving our method for the last three years, not because it contains anything new under the sun, but in the hope that if any of your readers have a better way they may make it known through the columns of THE FARMER.

We always thoroughly manure and prepare our seed-bed in the fall,

breaking up pretty deep. Toward the latter part of March, if the ground is frozen we don't sow, but wait until it thaws, even sometimes well into April, until the ground is in fair condition. We thought it necessary to note this little fact, as some of your younger readers may have been reading a little advice gratis, in some "Calendar of Garden Operations," outside the AMERICAN FARMER, something like this: "March 17th, now sow peas, beets, cabbage, etc., etc."

We run off the lightest kind of a mark along the line, sow the seed, then scatter sand—easy to get here—or some other light material to cover the seed, and to prevent the soil from adhering to the sole of the boot, as we tread in the seed, by placing one foot just ahead of the other all along the row, then finish by rubbing the bed lightly with the back of a wooden rake. Your readers may think this is taking considerable pains, but allow me to whisper, I have never in my life accused a seedsman of selling me bad celery seed, and have never had a failure. I omitted to say that every few feet in the row we drop a small pinch of radish seed; it comes up quickly and shows where the seed-row is, as celery seed will lie in the ground until every weed seed, both indigenous and immigrant—you may call that exotic if you prefer—grows up and smother it. About this time, early in June or earlier yet if need be, we thin our seed-bed considerably, generally drawing a thousand or so of the best plants and prick them out about three inches apart in the row and ten to twelve inches between the rows. This is done during showery weather and takes but a very short time if the hands are fairly expert; one draws the plants and drops them at the proper distance on the line, and the other sticks them in. We finally plant our celery the same as we cut the hay or any other operation, as near as possible when the majority of points are propitious. If nature would fix her dates for rain and shine, etc., we might fix ours for planting; as it is we consult her, and my! but she's fickle sometimes. We plant only six rows to a bed—formerly ten—seven inches apart one way, ten or eleven the other, more or less. We have been able for three years to have the beds slightly inclined lengthwise, so that we can take the back of a short-toothed steel rake and make a little furrow between each row from end to end, then run the water out of the water barrel into a hollow at the upper end of the bed, and the man has nothing to do but to regulate the flow of water and train down these furrows until the bed gets a thorough soaking. This is usually done about three times before any soil is put in the bed, although if the plants grow and spread considerably we do not hesitate to straighten them up by handling some soil around them after hoeing, having the furrows open for the water. Whenever the celery has grown so as to need a hill we put it in, always being careful that the bed has been well watered just previous to putting in the soil, either artificially or otherwise. If after this we are compelled to water—which is very rarely indeed—we are obliged to use cans.

And now comes the *rust*; whatever name it may pass under the effect is

the same. For the benefit of the inexperienced we may say that it comes on the leaves in the shape of small brown spots, which increase until the entire leaf withers. This is not owing to any treatment of the plant, nor to any system of culture, and up to date there is no certain remedy. Keep the celery growing as much as possible, and when the weather becomes cool the disease will cease.

The varieties we grow are the half dwarf, of which Golden Heart is a fair type. Now a word about the variety known as White Plume. We grow of this enough to last until about Christmas; after this date it is not acceptable here.

Our treatment for this differs slightly from that for later use; this we grow in a double row about six inches apart, and we put it where it is to grow as soon as the plants are of good planting size, and notwithstanding all that self-bleaching quality, we always give it two hillings by throwing the soil up to it with the plow, then rubbing it around the plant by hand the same as with the other varieties. As this is grown especially for early use, it pays to get it in condition for the table as early as possible. I have no hesitation in saying that in quality White Plume will bear no comparison with some other kinds, *except for use before Christmas*.

One other matter must not be omitted: avoid whenever practicable the use of manure near planting time, unless it be thoroughly decayed. We formerly grew early crops, as peas, beets, string beans, etc., on the celery beds, but as we grow now a small quantity—not having reached two thousand for some years—we grow nothing just where the celery will be planted, but work the ground right through along with the rest, thus keeping it in condition for planting whenever desirable.

One mistake the uninitiated are very apt to make, more frequently perhaps than any other, is, that they cover too heavy early in the winter. Light freezing will not injure celery; in fact it is necessary to check growth. We make a point of getting our soil on the bed in good time and we cover the celery pretty well over except the ends of the longer leaves. We have leaves hauled and placed at convenient distances on both sides of the beds, so that when the prospects are good for a pretty sharp frost we put on about two inches of covering, and when the weather has settled down for winter we put on about six to eight inches of covering, sprinkling sufficient soil over all to keep the wind from blowing off the leaves. This we find to be ample, never having the slightest trouble in keeping celery well into April.

As to storing; after trying various plans we have adopted the following as being the most satisfactory here: On a fair, pleasant day we take up a couple of hundred or so, according to need, and place them in the root-cellar in sand—in fact planting it in rows, leaving sufficient space to prevent danger from rotting.

To sum up, I have come to the conclusion that it is less trouble to get the plants stalky by the plan I am following, than to allow them to grow larger in the seed-bed, shearing them down to keep them in bounds,

etc., it being necessary to only shorten the outer leaves about one half when planting, and as the plants are mostly the same size, there is very little sorting to be done, and the beds are even throughout.

N. F. F.

Baltimore Co., Md.

THE GRANGE.

ACHIEVEMENTS OF THE GRANGE.

(Read before All-Hilalows' Grange.)

The Grange, from its inception to the present moment, has had advocates innumerable; indeed it seems to have been more prolific of orators than any organization of its time; they have been good, bad and indifferent. They have been listened to with some respect and much patience, and the fact that under such infliction the Grange has steadily grown in size and strength proves the soundness of its principles as set forth in the "Declaration of Purposes," and justifies faith in its teachings, and demands of every true man and woman, obligated at its altar, the most unqualified and loyal support, and calls with confidence to those still outside the gates to investigate its principles, scan with closest scrutiny its purposes, and earnestly study its objects and aims.

We have absolute confidence in the favorable result of such an examination, the more keen, the more thorough it is made, made without bias or prejudice, the more certain we feel that every true man and woman—moved by noble and lofty aspirations to serve their fellow-beings, will yield our order cordial approval, and, circumstances permitting, unite with us in our efforts to crush wrong, establish right, banish ignorance, enlighten the farmer and all others that can be reached by our influence.

Organized with only one object in view, to bring the farmers together, that a more frequent intercourse so prolific of social enjoyment would naturally lead to clearer understanding of each other's character, and discover virtues where none were supposed to exist; in short, to destroy the violation that had hung like a curse over the life of the tillers of the soil, this was the first and only aim of the founders of the Order, and grandly did they accomplish it. Aye, more, far more than any of them, enthusiasts as they were, dreamed of.

Let us scan for a moment the field of action, and present to your consideration a few of the results of the labor of the Patrons of Husbandry, nobly aided by kindred organizations.

As soon as they realized the happy results of the social element (upon which they founded their efforts) vast possibilities opened before them. As they continued to meet together, to talk together, to work together, they became inspired with the hope of acting together for mutual protection and advancement, and imbued with belief in the possibility of this all-essential unity of action; of this conviction was born the determina-

tion to widen the scope of action and form an army of brave, patriotic men as a standing menace to corruptionists, the sworn foe of wrong and oppression. Such an army must come from the rural population, as nearly all right, justice and patriotism had been swept away from the cities and great centres of trade by fierce competition, urged on by an inordinate and ever-increasing desire for gain, until it has become an all-devouring flame.

The corporate wealth of the country agreed upon but one thing, that the farmer, the producer of all wealth, was its natural and common prey. It swooped down upon him in every way, leaving him, not what right and justice demanded of the products of his labor, but studied to give only sufficient to sustain his strength to work yet again.

Such was the condition of affairs facing the Grange the first years of its active and aggressive life. Without a change! unless justice could be done, the agriculture of the country, and the farmer reach his legitimate place in the front rank of those pure and patriotic enough to unite with him in his efforts to save the country and its liberties, all would be lost! A determination to accomplish this characterized every meeting of Subordinate, State and National Grange, and from those gatherings flashed an intelligence that climbed every mountain, penetrated every valley, and swept over every plain in the land.

It was a revelation to the corruptionists! The farmers heretofore considered unworthy of notice, save as producers of wealth for others, loomed up as men of brains, and at a step became a powerful factor in shaping the affairs of the country, and all that was needed to make them irresistible was unity of thought, feeling and action. To accomplish this they must be shown their peril, made to realize it, and educate to discover and apply a remedy. The call was made; lecturers were put in the field, who traversed the country, arguing and pleading; they were listened to and heeded. Thousands from every section crowded the Grange hall, and thus established a school that has done more to excite purity of thought, destroy immorality, create and nurse into glowing life a lofty patriotism than all other influences combined. A bold declaration! and large claim! but, undeniable! If untrue, could the Interstate Commerce Law have been forced from an unwilling Congress and in defiance of the bitter hostility of the mighty corporations, so long all powerful in our State and National Legislature?

The iniquitous Postage Bill, compelling American seedsmen to pay just four times the amount of postage upon seeds that was charged the Canadian dealer, was headed off and destroyed at the moment of final passage.

Many other results of the labors of the Patrons of Husbandry as good, and some better, I could mention, but you are all familiar with them. They are a part of the country's history. But the greatest accomplishment of all I must mention: The destruction of sectionalism. Of all the feelings swaying the heart of the average American this has proved

the most powerful—the most destructive. Always existing in our country, but comparatively harmless, it lay dormant, only awaiting favorable conditions to fan it into a fierce flame, and such conditions were furnished by our unhappy war.

The bitterest feelings of hatred were engendered and nursed and treasured until sectionalism became the fixed principle in the lives of thousands of our countrymen north and south, rendering it impossible to find or recognize merit save at home.

The Grange early realized that the destruction of this demon was necessary, was absolutely indispensable ere peace would bless our land and give the incentive to work that comes from the knowledge that our labor is for the happiness and prosperity of the whole land.

The Grange set its strength to this task, and to-day there is scarcely a vestige of sectionalism among its members, and its influence outside the gates has been productive of grand results. And here let me give credit where 'tis due. The Alliance, child of the Grange, the great child of a great parent, has nobly given its aid. It is working upon the same line and for the same objects; its membership of 4,000, moved by a community of interest, stand pledged to the Agriculturists of this land, and having joined hands with the Grange will, in good time, accomplish the purposes for which they are banded together.

I have never been able to understand why every farmer in the land is not a member of some agricultural society; the cause they struggle for is his.

If anything I have said directs the thoughts of a single man or woman to that cause, I shall be more than gratified.

To you, Brother Patrons, a few words: Give more of your time and labor to the cause; be more consistent; live up to your principles; remember the mantle you now wear must soon drop from your shoulders; wear it worthily, that those upon whom it falls may respect your life's record, and reverence your memory.

Teach these principles to your sons, that they may teach them unto theirs; That generations yet unborn may teach them to their heirs.

One of the first points to be learned in educating ourselves to co-operate is this: That co-operation is not a new plan of transacting business, but rather a different method of dividing the fruits of industry,—to labor rather than to capital. The same principles that govern success in acquiring profit on capital apply to the acquirement of profit to divide upon labor or goods. Industry, application, perseverance, good judgment, thorough business management—all are required in co-operation as in the existing methods of business. When a store is run by a manager who does not stick to business principles, when it sells its goods without sufficient margin, when it permits credit indiscriminately, it is no wonder failure results. Such management will fail whether the store is operated by a private individual for his personal gain or is owned co-operatively.—*Farm and Home.*

The American Farmer.

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Maryland State Farmers' Association.
Maryland Horticultural Society.
Maryland Dairymen's Association.
Maryland State Grange, P. of H.

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OUR OFFICE.

Our friends will remember that our location has been changed, and that we are now to be found at the Northwest corner of Baltimore and North streets, Baltimore, opposite the *American* and *Sun* buildings, with entrances at 228 East Baltimore and 6 North streets. The sign of "The Golden Plow," which has long designated our whereabouts, has a conspicuous and glittering place over our North street doorway.

CROP REPORTS.

The June report of the Department of Agriculture makes the area in winter wheat, as compared with the breadth harvested last year, 111.5; spring wheat, 103.4; barley, 107.1; rye, 101.5; oats, 97.9.

Condition: Winter wheat, 96.6; spring wheat, 92.6; barley, 90.3; rye 95.4; oats, 85.

In comparison with 1889 the increase in wheat acreage is quite moderate. The reduction last year of more than two million acres suggests the reason for most of the present increase. This advance is therefore both replacement and development, the former notably in Illinois, Missouri, Kansas and California, the latter in less degree in Washington, Or-

egon, the Dakotas and several Territories. The extension of acreage, according to correspondents, depends on price of wheat and not on available land. A large increment of wheat breadth is reported in Washington. "A large amount of new land is being broken for next year's crop," and the local opinion is expressed that not more than one-fifth of the wheat land of that new State is under cultivation.

The winter wheat is encroaching upon the southern and eastern borders of the spring wheat district, notable in Iowa and Wisconsin, under the protection of crop diversification and new methods of cultivation, while spring wheat extension responds moderately to the stimulus of higher prices.

The condition of winter wheat has declined only one point. The average in New York is 96; Pennsylvania, 97; Georgia, 98; Texas, 98; Ohio, 99; Michigan, 90; Indiana, 99; Illinois, 98; Missouri, 99; Kansas, 95; California, 97.

The first monthly statement of averages of spring wheat makes Wisconsin, 77; Minnesota, 89; Iowa, 95; Nebraska, 97; the Dakotas, 96. Early sown wheat was injured by frost in Wisconsin and Minnesota. Germination was arrested by drought in the same region. In south Dakota drought has retarded growth. Conditions were more favorable generally in North Dakota. Recent rains in Nebraska and Iowa have greatly benefited wheat and encouraged the growers.

Drought in May greatly injured oats on the entire Atlantic coast. Winter oats in the Southern States are far better than the spring crop, which has been partially destroyed by drought and insects. Not only was the acreage reduced in the Ohio Valley, but condition is low in consequence of dry weather. In Minnesota the injuries of drought were supplemented by those of cut worms. Condition is highest on the Northern Atlantic coast and on the Pacific, where areas are very limited.

The increase in the acreage of barley is general. Condition is uniformly high. The report makes the acreage in cotton 97.7 per cent. of the area of 1890, and the average condition 85.7.

The reduction of area is attributed in some districts to concerted contraction on account of low prices, but it is evident that it is mainly due to unfavorable conditions for planting and germination. Planting delayed by early rains, drought in the latter half of April, followed by continued drought in May, germination arrested, replanting active, defective stands corrected, are the features of the record.

The areas as compared with those of last year are given as follows: Virginia, 96; North Carolina, 94; South Carolina, 96; Georgia, 95; Florida, 99; Alabama, 96; Mississippi, 95; Louisiana, 96; Texas, 105; Arkansas, 96; Tennessee, 95.

The temperature of May was quite too low for cotton, the cool nights checking germination and retarding growth. Of course these conditions make the crop late in development, in some places a few days, in others a week or two later than in seasons of early development.

MEETING OF PEACH GROWERS.

A large meeting of peach growers was held at Chestertown on the 11th instant. Wm. B. Uailton was chairman and Hiram Brown secretary. A committee was appointed to wait upon the officers of the boats or companies which carry the fruit and produce from Kent and Queen Anne's counties to market and request them to provide slats with cleats to place between the baskets to prevent crushing the fruit.

It was resolved that it is in a great measure the shipping of small, green or overripe fruit which breaks down prices, glut the market and brings disaster to the farmers, and it was urged upon all shippers, tenants and landlords to ship nothing but good, saleable fruit and all carefully culled. A resolution was passed that a committee be appointed to wait upon transportation companies to secure a reduction of freight on peaches to Baltimore this year. A committee of one from each district of Kent and Queen Anne's counties was appointed to visit each shipping wharf and railroad station in the two counties and ascertain the approximate number of baskets and boxes of fruit that will probably be shipped from each of those points, both by rail and water.

James S. Harris, of Still Pond, said there was a prospect for three hundred thousand baskets in his district, a scope of six miles, and the outlook was that nearly all will go to Baltimore.

Robert S. Emory, of Chestertown, said there is a grand prospect, and that Baltimore is the best market in the world. J. S. McCallister, of Price's Station, Queen Anne's county, says the prospect there is for 250,000 baskets. Mr. Wright informed the growers that greater preparations are being made in Baltimore by the packers than ever before. B. Trew said that packers would be able to consume 75,000 boxes per day.

The crop in Kent is variously estimated at from two to two and a-half millions of baskets. The June crop is now on, after which more definite estimates can be made.

HOME DEPARTMENT.

REST.

I wish every "sister" would take some pains to get hold of Harper's Monthly of June, 1891, and read, mark, learn and inwardly digest the article under the title, "The Technique of Rest." If I were not sure that the Magazine is to be found in every neighborhood, and that those who have read the above article will be only too glad to circulate such wholesome sentiments by lending the book to those who have it not, I would quote at length from it. We who are heads of households, more than any other class of people, need to husband our resources of mind and body as well as of estate. The families for whom we are natural sponsors are affected directly, and indirectly, by our condition, mental as well as physical, and it is therefore due them as well as ourselves that we pay more attention than is usual to the care and preservation of

ourselves. It is indeed time to take heed that we may not become imbecile or invalids, even though we escape an untimely grave!

Nothing is of so much importance in a home as a well-preserved wife and mother; nor does anything else reflect so much credit upon the father and children. Not that a weary, worn-out housekeeper may not be herself the one who is to blame, but people generally look to the husband, and children if they are grown, to stand between her and the need for over-doing. Quite as often it is a woman's own fault that she does not have the proper amount of rest and recreation. Few women take pains to so order their household matters as to enable them to take the rest they should or to give them time to read, simply because they are more interested in their work, and do not realize the injury incessant work is doing them. Even when the mischief is done they are ignorant of the cause of it, especially when it ends in a mad-house, as it too often does.

What we, women whom God has placed over our households as keepers of the best interests of every man, woman and child in them, need, is to make a duty, as solemn as any that our religion imposes, of taking good and proper care of every power God has given us, and in order to do so we must learn to know what we require to keep ourselves in a nominally healthy condition. The "Stranger" (which by-the-by is a misnomer) does well in cautioning us to beware how we eat, though she is prone to err a little in her desire to have us live simply. She confounds simple living with light living. People who use up their vital forces by violent exercise need strong meat to sustain them. No class of people makes greater demands upon their strength than country housewives, and therefore they need good muscle-making food and plenty of it, and they need rest, which it often seems impossible to get, but if they are good and true women they must care for their bodies and minds as much as for their souls. The purpose of the Great Creator is fulfilled by one as much as the other, and we have no more right to neglect one than we have to neglect the other.

Real duties seldom force us for any length of time to neglect the care we need. Fancied duties and obligations, and ambition, are mostly the cause of our over-doing. Behind all this, however, is want of thought, and often, too, of knowledge. They do not learn such lessons as they might from their own experience, and when they know they are abusing themselves they persist in so doing from a mistaken idea of duty, or from a spirit of desperation—either of which is a sinful disregard of our real duty to our neighbor and to ourselves.

If we would be capable, we must be careful—careful to keep the balance between our strength and the demands upon it. In that way only can we best serve those for whom we live, and finally give a good account of our stewardship. CERES.

THEY say we should not talk so much about servants, that is very bad taste to do so anywhere and extremely bad form to do so in society. Nev-

ertheless it is the one subject that crowds to the front whenever and wherever two or more housekeepers gather. I think, considering their power for good or evil in the household, it would be very hard to avoid discussing them, and if it is done without malice, we may discuss them, and our neighbors, too, to our mutual advantage. I will not, however, occupy my time and space here with preliminaries. I am moved to talk of servants here just now by my neighbor's experience rather than my own. She is a young housekeeper with three small children, and has run the gamut of such help as the average Maryland communities furnish since baby No. 1 put in an appearance (of course, I mean colored help) and has had the usual amount of comfort and discomfort, especially the latter, from them. At last she has ventured upon trying a white girl who, although not exactly *lady help*, comes nearer being *helpful help* than any but a sister could be. She does unhesitatingly the most unpleasant parts of the house-work, but is ready to do just what is needed first, and all the time, be it cooking, cleaning or minding the children; will take her time when it best suits all round. And then she is so much to the children, amuses and interests them even when busy with other things, is as much concerned about their right doing as if the responsibility of their training was entirely hers. In this way my friend is able to run her house pleasantly and comfortably with just her help, which she could not formerly do with that of a cook and a nurse together. I think I hear you one and all exclaim, what perfection of comfort! Yet there are drawbacks, one of which is that, according to our fixed notions on the subject, the girl does not *know her place*, and my friend, who has very nice ideas about such things, would, if she was less sensible, be made very uncomfortable. For instance, when called to the parlor to receive guests, to find her help seated with baby on her lap entertaining the visitor to the best of her ability; or, when in the midst of family chat, to have her give her ideas or experience, as a matter of course. But, happily, Mrs. — has so much tact and good feeling, as well as true dignity, that she always finds the right way to divert the maid without wounding her. It would seem an easy matter to tell her just how and when she errs; but inasmuch as she has not the slightest tendency to impertinence or any idea of what we call *place*, it would be a cruelty to draw lines upon her, and would undoubtedly be the means of *breaking owners*. We all of us, very likely, have been uplifted by the accounts of the approaching settlement of Danes in this part of the country, hoping it may fall to our lot to secure some of the young women for help, and that is why I offer this expression of my neighbors. It is that kind of help they will be, and we, who are used to drawing lines between mistress and maid, rather sharply, will have to educate ourselves over again before we find the comfort from such help. That is possible only if we know how to avail ourselves of it. Ponder these things, my good sisters, before you put in a plea for help in that quarter. DOROTHEA DOOLITTLE.

VOTING.

Women possess the right to vote more extensively than is generally supposed. In Austria women can vote as nobles, in their corporate capacity as nuns, and as tax-payers. In some cases, however, they vote by proxy. In Hungary, up to 1848, widows, and single women who are landed proprietors, possessed the right to vote. They were deprived of it by the revolutionary government, and are now petitioning for the restoration of this right. In Canada, as in several of our own States, women are allowed to vote for and serve as school trustees. In the British Australian colony of Victoria women universally assumed the right to vote about four years ago, having found that the law had been so framed as to permit them. In Sweden, chiefly through the exertions of the late Fredrika Bremer, an indirect right of voting was in 1862 granted to all women possessing specified property qualifications. In Italy a widow, or wife separated from her husband, may vote if she pays taxes. Also in Holland, single women possessing property are entitled to vote on all questions likely to affect its value. In many towns in France women possess and exercise the right to vote in municipal affairs.

HINTS AND HELPS.

SCHOOL LUNCHEONS.

I go to school myself, as a teacher, and my lunch to-morrow will be a small dish of boiled beans, with a fork to eat them with. A grape tart lies on a saucer; it is firm and iced. A piece of ginger-bread is there, wrapped in light wrapping-paper, pinked out. To-morrow morning I put in some long sandwiches, three mouthfuls in each, with chopped meat for filling; these are wrapped separately, too. There is a well-corked mustard bottle filled with canned fruit; another, with some pickle. Two napkins with all. The children bring me apples. Fresh fruit is a necessity; we want it at eleven o'clock, and at nooning eye our preserves with disfavor. We want vegetables, we want knives and forks and a hatchet too, if you give us *sliced meat*. You go and eat with fingers and then be intellectual. Put the dear things' future brains up in baskets or boxes, don't pail them. Here follow suggestions for our pleasure:

1. *Meats*.—Sausage, salads, hashes, minced meats, pates, croquettes, sousses, meat pies.

2. *Vegetables*.—Salads of potato, onion, tomato, any cold vegetable, beans, succotash, cabbage slaw.

3. *Fruit*.—Canned or fresh.

4. *Bread*.—Rolled sandwiches, once a week; biscuit sliced thin; butter sometimes put in in little plate. Always wrap bread up in paper, one slice by itself.

5. *Relishes*.—Deviled eggs. Nuts. Grated cheese. Cheese straws. Bottle of milk, or chocolate, or lemonade. Cream puffs, Charlotte russe, chocolate eclairs, any small cakes, home-made or bought; cream dates,

walnuts, etc. Always pickle of some sort.

6. *Knife, fork, small spoon* to reach in glass bottles. Two napkins; if one is of paper, it will do. Save all pretty papers. We want to show our lunch off to the others, you know.

S. D.

A FEW RECIPES FOR LUNCHEONS.

It often happens that one has, left over, slices of cold boiled ham, which are nice in every way, but still are not presentable on the platter. There are two ways in which they may be used to advantage. The first is, to chop the ham fine, and mix it with bread crumbs which have been moistened with well-beaten eggs. Make in the shape of balls, and fry in a little hot lard. The other way is, after chopping the ham, to mix egg with it, and heat it in a saucepan in which you have first put a lump of butter. When the eggs are cooked, serve with dry toast. This may be spread on the toast, if you choose.

BEEF LOAF.—Chop very fine, or have your butcher mince two pounds of coarse lean beef. Season spicily with pepper, salt, nutmeg, summer savory, or sweet marjoram and a cautious sprinkling of minced onion. Beat two eggs light and work up with the mass. Press hard into a bowl, fit a saucer or plate (inverted) upon the meat and set in a dripping pan of boiling water to cook slowly for an hour and a quarter. Lay a weight on the surface when it is done and let it get perfectly cold before turning out. Cut in perpendicular slices.

COLD MEATS.—Joints or poultry intended to be served cold should be left untouched and not cut up until the time of serving, in order that their natural juices may be retained, and give succulence to the meat, instead of oozing out and getting wasted. The same of cold pies—as veal, chicken, rabbit, and so on.

A most excellent dish for dessert is made of a cake about an inch and a-half deep after it is baked. The cake should not be rich. Put a light meringue on the top, brown this in the oven, cut the cake in square pieces, and serve warm with wine sauce, or with lemon sauce. The sauce must be at the boiling point, and it should be poured around the cake so that it will penetrate it readily. If properly made, this is delicious.

SLICED BANANAS and oranges mixed with chopped pineapple, with powdered sugar scattered over all, make a delicate dish for the 5 o'clock tea.

WHEN making layer cake which is to have a filling of fresh fruit, or one of any kind which ought not to be put in until it is time to serve it, it should be taken from the tins in which it is baked and be placed on the tins turned upside down. Take the precaution to heat these tins if they have cooled, in order to prevent the cake's falling.

NOTHINGS.

CARAMEL.—Take some burnt sugar, remelt in any mold and tilt around until it is covered. Let it cool, and fill up mold with any jelly or pudding. Heat and slide out.

PAINT.—Paint posts with soot or charcoal on end to put in ground.

AWNINGS.—Make piazza or tent awnings of old ticking bound with red in scallops.

PICKLES.—Use string beans and radish pods for pickles.

COLD MACKEREL.—Take any bits fish; shred with bread crumbs moistened; shape as a fish; cover with some gravy or sauce. Bake or fry. Serve hot in slices. Potato may be used.

HAMMOCK.—Take barrel staves and rope. Intertwine on edges and tie.

CURTAINS.—Any material gathered on stout wooden sticks may be used, on upper or lower half, or both, either same material or not; draw to opposite sides, or together.

POMONA.

MILK WEED FAIRY BAGS.

"The seed pod on the milk-weed tall,
Is but a seed pod—that is all."

But to the farmer's daughter the shining brown seeds and feathery plumes suggest pretty ornaments for her home or gifts to her friends. Fairy bags is an appropriate name for the graceful "throws" which are made from illusion or white silk gauze veiling; I think the latter is prettiest. A nice size is made of a breadth of the veiling 22 inches long. Sew the edges together, fold it so that the seam comes in the middle of the back, sew up one end, then fill with the contents of two or three pods and sew up the other end. Across each end put chenille ornaments or crochet a tasselled fringe of silk, tie in the center, and you have a "thing of beauty" if not "a joy forever." Sachet powder sprinkled in the filling makes it a delight to two senses.

TO MAKE FLOWERS OF Milk-weed down, take a broomsplint and a number of short pieces of thread; then wetting the plumes of a few seeds in your mouth, tie them to the splint. Repeat until the flower is as large as you wish; dry by a lamp or the stove. They are very pretty mixed with grasses for winter bouquets, or a group of half a dozen may be tied together with bright ribbons and fastened on a dark velvet panel or banner.

A PERPETUAL PASTE.—Dissolve a teaspoonful of alum in a quart of water. When cold, stir in as much flour as will give it the consistence of thick cream, being particular to beat up the lumps; stir in as much powdered rosin as will lay on a dime, and throw in half a dozen cloves to give it a pleasant odor. Have on the fire a teacup of boiling water in a suitable vessel, pour the flour mixture into it, stirring well at the time. In a few minutes it will be of mush. Pour it into an earthen or china vessel, let it cool; lay a cover on, and put in a cool place. When needed for use, take out a portion, and soften with warm water. Paste thus made can be kept twelve months. It is better than gum, as it does not gloss the paper, and can be written on.

MANAGEMENT OF KEROSENE LAMPS.

All who have experience in the use of mineral-oil lamps must, sooner or later, learn that the condition demanded for their burning without smell is that the wick shall be turned up so as to obtain a full-sized flame without actual smoking. It is commonly supposed at first that by keeping the flame low all objectionable odor is prevented; but the contrary is the case. Something more may be learned by first charging a lamp with a measured quantity of oil, burning it with the flame at full size for a given time, and ascertaining the loss of oil, then making a second experiment with the same lamp, same quantity of oil, burning the same time, but with wick turned down so as to have but a fraction of the amount of light supplied during the first experiment. On measuring the loss of oil this time, it will be found but little less than in the first case. Therefore, in turning down such lamp flames, we obtain no such saving of material as in turning down a gas flame. The reason is that with the low flame a considerable quantity of the products of incomplete combustion are making their escape into the air; and these are not only offensive to the sense of smell, but are also injurious to the health.

OUR BOYS AND GIRLS.

A QUEER PET.

"Mother, may I buy a canary bird with the money I get for the edging I am knitting?"

"I have often told you my feeling about shutting up innocent animals just to give one's self a little pleasure."

"But, mother, I do want a pet—a live pet that I can feed and play with; it would be so nice."

"Well, dear, I can tell you of a live pet that you have my full permission to get and keep, to feed and water and attend to in every way. It will cost you no money, either—only a pleasant walk to some swamp of which I know, near the city."

"But, mother, I thought you just said you thought it to be cruel to cage little animals for our own pleasure?"

"So I do. The pet I refer to will need no cage, nor is it an animal. It is a plant."

"O, mother, I love flowers, you know; but they don't know anything, and it isn't any fun to watch them."

"I think I can help you find a beautiful little plant which you can bring home, and which will in time teach you that some plants know a great deal, and that they do things which you will think very queer. Have you ever heard, Ruth, that there are plants that eat meat and digest it, much in the same way as animals do?"

"No, indeed! Why, they have no mouths nor stomachs."

"All that we shall see by-and-by; only tell me, are you willing to take my little plant instead of a canary, and see how many interesting things we can find out by watching it grow?"

"Yes, indeed, if it will do anything as queer as to eat meat."

In a few days Ruth went with her mother to the end of the horse-car lines; and then they took a short walk to a low, boggy piece of ground, and began to look about. Before long, Ruth said:

"What's this little white flower? It has pretty, round leaves, all covered with red hairs."

"That is called sundew, and is what we came to find," said her mother.

They gathered with care, so as not to injure the roots, several healthy plants, and then sat down to examine them. Ruth found that each plant had not more than six leaves, of a roundish shape, and not larger than her little finger nail. On the upper side of each leaf were many, sometimes even two hundred dark-red hairs, with thickened ends. The inner ones were shorter and much more erect than the outer ones.

"These hairs are called tentacles," said Mrs. Grant. "See if you can guess of what use they are to the plant."

"To look pretty?" asked Ruth.

"They are pretty; and the sticky drops of liquid at their tips, which sparkle so beautifully in the sun, give the plant its common name. But they are of real service to the plant, and I want you to try and find out in what way."

"Why are there so many little gnats and flies on some of the leaves, mother?"

As Ruth caught her mother's smile in reply, she recalled the talk of a few days before and quickly said—

"Oh, I wonder if this is the meat you meant?"

She looked more closely, asked many questions of her mother, and finally went home, well assured that she would enjoy cultivating her plant pets. This she did for many weeks; and what she thus learned with the help of her mother's questions and suggestions, I will tell you.

First, her mother taught her that the little red hairs on the leaves of the sundew are glands, and that glands are parts of a living being, either of an animal or of a plant, which have the power of making from the blood of the animal or the sap or juice of the plant a certain kind of liquid material which is intended for some particular use. This action of a gland is called *secretion*, and the material that is made and at certain times sent out of a gland, is said to have been secreted. There are a number of glands alongside of a person's mouth, which secrete the saliva, or liquid which moistens the mouth and softens the food as we chew it.

The pretty little gland-hairs or tentacles of the sundew secrete a sticky liquid, which has its own use. When a gnat or a little fly happens to alight on one of the leaves of the sundew, the hair or hairs which it chances to touch appear irritated and begin to move, slowly curling or bending in toward the centre of the leaf. Not only this, but as soon as one hair begins to move, it seems to rouse the ones near it, so that, if an insect only touches one or two of the tentacles, a good many of them are often set in motion. Now, as soon as these tentacles begin to move, the sticky juice which glitters on the leaves is secreted more rapidly and

also changes in its nature; for, while before there was any excitement this liquid was very slightly if at all acid, it becomes quite so as soon as the quantity of liquid begins to increase, and in this respect greatly resembles a substance called the gastric juice, which is secreted in the stomachs of backboned animals and helps to digest their food.

Sometimes, the insect which happens to touch the sundew leaves and so sets up such a commotion, flies away without resting long enough to be caught in the sticky juice, in which case the excited hairs gradually straighten up again. But very often this is not so; and if it either sits still or is held by the fluid, more and more of the hairs bend in over the unfortunate little fellow and hold him fast, just as your fingers clutch an apple. The edges of the leaf are turned inward by the blending of the tentacles, and so make a sort of temporary stomach, in which the insect is gradually smothered by the acid liquid. For all the hairs to bend in completely will take from one to five hours. But most insects that are caught will die inside of a quarter of an hour. The nutritive juices of insects are absorbed by the leaves, become part of the sap, and so help to nourish the plant. The same thing happens, if small pieces of beefsteak are placed on the leaves. But the cunning little tentacles seem to have a good deal of power to discriminate between substances; for, while any object that comes into contact with them may cause movement, indigestible articles, such as glass, cork or cinders, will be held a much shorter time, and when these are found to be of no use, the tentacles unclose, and leave such substances free to drop away.

A very slight weight will excite motion in the tentacles, even the pressure of a gnat's foot! These plants generally grow in moist ground, as by way of their roots they drink up a great deal of water, which they require to manufacture the liquid which comes out through the tentacles in such tiny drops. They could probably live without animal food, but it was found that plants not thus fed did not produce so much seed. So it would seem that, in course of time, the sundews might all die out, if they were confined to the diet of ordinary plants.

There are a great many species, or kinds, of sundews besides this of which I have told you; and there are other plants very different from the sundews which are also known to be carnivorous, or meat-eating plants. The great botanists are carefully studying them, and are constantly finding out strange and interesting facts about them.—Christian Register.

No authority on fishes has been able to say where the sea trout and the salmon go in winter; but before the brooks and rivers begin to freeze in the late fall they gather in large bodies, pass rapidly down stream, and swim away for deep waters. Nothing is seen of them again till toward the 1st of June, when they congregate about the mouths of tidal rivers and brooks.

THE AGRICULTURAL COLLEGE.

PRINCE GEORGE'S COUNTY, MD., June 12.—Annual meeting of the board of trustees of the Maryland Agricultural College was held at the college June 12. The trustees present were Governor Jackson and Messrs. White, Baughman, Brattan, Hubner, Brown, Walsh, Silver, Biedler, Wells and Seibert, a quorum for business. It was found that the income of the institution for the next year will be fully equal to its needs, and liberal appropriations were made for the support of the different departments. The salaries of all the regular professors were somewhat increased, in accordance with the intention of the new Morrill act, adding to the income of the college.

The president and professors of the college were re-elected, except that Prof. E. W. Doran, Ph. D., of Missouri, was elected to the chair of zoology in place of Dr. A. C. Wightman, resigned. Lieutenant Scott, United States Army, tendered his resignation as acting professor of mathematics, as he is about to be ordered to rejoin his regiment. The board voted to apply to the War Department for the detail of another officer to take his place. The present director and staff officers of the experiment station were also re-elected. The appropriations for the station include specific sums for conducting special experiments with tobacco, including improved methods of curing, and also for continuing the study of the agricultural capabilities of the soil in various parts of the State.

EXPERIMENT STATION RECORD.

For May, 1891, Vol. II, No. 10. Director W. O. Atwater has just published the above, containing the usual summary of the Experiment Station work of the various stations, arranged by stations and by subjects, so that we can refer quickly to any work done.

BRIEF NEWS SUMMARY.

FOREIGN.—The Itata, the vessel of the Chilean insurgents, which escaped from San Diego, Cal., arrived at Iniquie and was surrendered to the United States man-of-war there and will be returned to the United States.—The British Parliament has passed the bill, making a closed season as regard sealing in Berling Sea, and arrangements have been made to enforce the law by great Britain and the United States.—Sir John Macdonald, premier of Canada, died.—Colonel Lebel, the inventor of the Lebel rifle, is dead.—The London 'bus drivers are on a strike.—Hippolyte, President of Hayti, is accused of most atrocious murders in suppressing an alleged revolution.—The German government's decision to maintain the corn duties has caused widespread discontent among the working people, and a bitter feeling against Chancellor von Caprivi has developed.—The baccarat scandal case ended in a verdict for the defendants, thus sustaining their accusations that Sir William Gordon Cumming cheated in the games with the Prince of Wales. The

verdict, when announced, was hissed. The Wilsons and others who testified against the baronet, were treated with contempt by the spectators, while popular sympathy was expressed for the baronet.—Sir William Gordon Cumming the plaintiff in the baccarat trial, was married in Chelsea, to Miss Florence Garner, daughter of the late Commodore William Garner, of New York city.—While Emperor William of Germany was exercising a party of grenadiers on the parade ground at Tempelhof, Germany, lightning struck the captain of the party and three soldiers, killing two of the latter and dangerously wounding the captain and the other soldier. It is supposed that the rifle barrels and bayonets attracted the electricity.—The towns of Badia, Calavine and Trognanzo, in Northern Italy, were destroyed by an earthquake. The inhabitants were compelled to take to the fields for safety.

GENERAL.—The President appointed three Republicans and two Democrats members of the Court of Private Land Claims. Joseph R. Reed, of Iowa, is to be chief justice, and Wilbur F. Stone, of Colorado, Henry C. Sluss, of Kansas, Thomas C. Fuller, of North Carolina, and William Murray, of Tennessee, associate justices. Matthew G. Reynolds, of Missouri, was appointed United States attorney for the Court. Messrs. Sluss, Stone and Fuller are Democrats, the others Republicans.—At Warrens and Sivils' bends, in the Red river, not far from Gainesville, Texas, 10,000 acres of cotton and other grain, are under water. The flood is the greatest since 1867.—Benson J. Lossing, the historian, died.—The secretary of the treasury has called in \$3,000,000 bank deposits.—The President has appointed Hon. William D. Owen, of Indiana, superintendent of immigration.—A severe storm on the lakes wrecked a number of vessels.—Secretary Blaine is gaining health at Bar Harbor.

MARYLAND.—The main building of the Concordia Opera House was burnt out; the annex building was damaged also by fire and water. The loss is estimated at \$80,000.—The North German Lloyd steamer Dresden arrived with 1,295 immigrants.—Mrs. Stuart Kearney, nee Geigan, of this city, accidentally shot herself dead, at Sykesville.—The young democracy of Cecil county carried through their programme in convention, nominating a ticket, electing delegates to the State convention, endorsing Hon. Frank Brown for Governor and declaring in favor of re-electing Senator Gorman.—The Kent county democrats created a surprise by nominating Dr. Fisher for clerk of the court and Mr. Hepbron for the State Senate. It declared in favor of James Alfred Pearce for the United States Senate from the Eastern Shore of Maryland.—Over 50,000 people visited Hagerstown during the meeting of the German Baptists last week.—Directors of the City Passenger Railway decided to cable the White and Red lines and to experiment with a storage-battery system on the Blue line.—Jacob Bonnett, who committed suicide in Baltimore last week, was secretary and treasurer of the Rothschild Building and Loan Association, and a defaulter to about \$100,000. In addition he was the custodian of funds placed in his hands by a number of poor persons, ranging from \$50 to \$1000. The money was lost by dealing in lottery tickets.

BALTIMORE MARKETS—June 15.

BREADSTUFFS.
Flour—Dull, but steady, with sales at figures named. City Mills Super. \$3.85a3.95; Red Extra \$5.40a5.65; Western Super. \$3.85a3.95; Extra, \$4.25a4.65; Family, \$4.75a5.25. Baltimore high grade Family \$5.85.
Wheat—Southern nominal at 100c., 100c. for Fultz, 100a110c. for longberry. Western weak, with sales of No. 2 red spot at 100c., July 10c., September 10c.
Corn—Receipts of Southern very light, and quotations nominal for white at 70a71c., and for yellows 67a68c. Western dull, mixed spot being quoted at 63c. cts., July 62c. cts.
Oats—Weak. We quote ungraded Southern and Pennsylvania 51a54c. Western white 53a 54c. cts.; do. mixed 50a52c. cts., stained and inferior 48a50c. cts. No. 2 white 52a53c. cts., and No. 2 mixed 52c. cts. per bushel.
Rye—Inactive at quotations. Choice Western 70a72c. cts., good to prime, 69a65c. cts., and common to fair 63a67c. cts. per bushel.
Hay and Straw—Hay firm. We quote: Choice, 13a13.50; good to prime, 12a12.50; mixed, fair to good, 10.50a11.50; common and inferior, 8.50a9.50; clover, 9a10; off grades, 8.50a9.50 on track. Straw firm and steady. Rye in carloads at 17.50a18 for large bales in sheaves, 12a13 for blocks; wheat, blocks, 2a2.50; oat, blocks, 11.00a11.50. At Scales—Hay—Timothy, 10a11.50; Clover Hay 7a11 per ton. Straw—Wheat, 38. Rye, 14a17. Oat 29 per ton. Ear Corn 3.75a4.00 per bbl.

Mill Feed—Quiet but firm. Western Br light, 12a13 lbs., 21.50a22.50; medium, 14a16 lbs., 23a24; heavy, over 16 lbs., 19a20, and Middlings 20a21, all on track; City Mills Middlings, 23 per ton, delivered.

Provisions—Steady at quotations. Sugar-pickled Shoulders 6c. cts.; smoked sugar-cured Shoulders, 7c. cts.; sugar-cured Breasts, 8c. cts.; canvased and uncanvased Hams, small averages, 11a12 cts.; large averages, 11a11.50 cts. per lb. Mess pork, old, 12c. 00, and do. new, 13c. 00 per bbl. Lard, best refined, pure, 8c. cts. per lb.

Butter—Fancy creamery jobbing at 19 cts., good to choice creamery 16a17 cts. per lb. Imitation creamery 16a17 cts. per lb. Fancy lard-packed 15a16 cts., prime to choice do. 13a14 cts. per lb. Store-packed 11a12 cts., and creamery prints 19a20 cts. per lb.

Cheese—Fancy full cream, New York State, 55 to 60 lbs., 10a10.50 cts., choice full cream, 9a10 cts.; New York flats, 30 to 35 lbs. size, 10a10.50 cts. per lb.

Eggs—Demand light, for fresh-laid hen eggs at 16c. cts. per dozen.

Poultry—Tending downward. Quotations: Large spring chickens, 20 cts. per lb., small do. to medium 16a18 cts. per lb., old hens 10a 11 cts. per lb., and old roosters 25a30 cts. apiece.

Canned Goods—Active. Quotations: Two-pound Peaches, 1.90a2.00; two-pound tomatoes, 45 cts.; three-pound do. 85 cts.; two-pound Green Corn. 25a30 cts.; Marrowfat Peas, 1.10a1.15; Early June Peas, 1.25a1.40.

Tobacco—Active, except in common grades. The contract for the supply of the French government with Henry Lentz & Co., takes 9,000 hds. Maryland and 2,300 hds. Ohio. We quote: Maryland—Common and frosted, per 100 lbs., 1a1.50; sound common, 2a3; good common, 4a5; middling, 6a8; good to fine red, 9a11; fancy, 12a13; upper country, 3a3.50; ground leaves, 1a2.

Wool—Dull. We quote unwashed, 22a25 cts., tub-washed, 30a33 cts., pulled, 25a28 cts., and Merino 16a18 cts. per pound.

LIVE STOCK.

Beef Cattle—Only moderately active. Prices of Beef Cattle ranged as follows: Best Beeves 5.75a5.87; those generally rated first quality, 4.75a5.02; medium or good fair quality, 3.50a 4.50, and ordinary thin Steers, Oxen and Cows 2.00a3.00 per 100 lbs.

Sheep and Lambs—We quote sheep at 3a4 cts. per lb. gross, and Lambs 5a7 cts. per lb. gross.

Swine—In fair supply with sales. Near-by hogs at 6a6.50c., and the better grades, good Western hogs at 6a6.50c., most sales of the latter at 6a6.50c. per lb. net.

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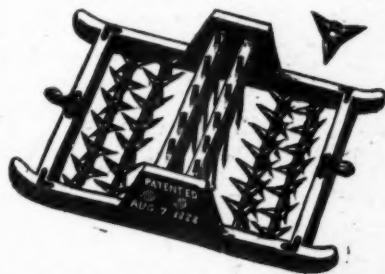
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